RESEARCH, DEVELOPMENT and TECHNOLOGY TRANSFER
QUARTERLY PROGRESS REPORT (QPR)

Wisconsin Department of Transportation (WisDOT)
DT1241 5/2014

INSTRUCTIONS:
Research principal investigators and/or project managers should complete a quarterly progress report (QPR) for each calendar quarter during which the projects are active.

WisDOT Research Program Category	**Report Period** *(enter year and check which quarter)*
☐ Policy Research	Year: 2014
☒ Wisconsin Highway Research Program	☐ Quarter 1 (Jan 1 – Mar 31) ☒ Quarter 3 (Jul 1 – Sep 30)
☐ Other: _____	☐ Quarter 2 (Apr 1 – Jun 30) ☐ Quarter 4 (Oct 1 – Dec 31)

Project Title	WisDOT Project ID
Evaluation of the Foundation Movements of Transportation Structures	0092-09-05

Principal Investigator Name	Project Oversight Committee Chair Name	Project Start Date (m/d/yyyy)
Dante Fratta	Bob Arndorfer	2/5/2009
(Area Code) Telephone Number	**(Area Code) Telephone Number**	**Original End Date (m/d/yyyy)**
608-265-5644	608-246-7940	2/4/2012
Email Address	**Email Address**	**Current End Date** (m/d/yyyy)
fratta@wisc.edu	Robert.Arndorfer@dot.wi.gov	11/30/2014

Project Schedule Status *(check one)*
☐ On Schedule ☒ On Revised Schedule ☐ Ahead of Schedule ☐ Behind Schedule

Project Budget Status

Total Project Budget	Expenditures Current Quarter	Total Expenditures	% Funds Expended	% Work Completed
$109,893.00	$4,516.81	$109,893.00	100%	95%

Project Description
- The overall research objective of this study is to produce a document summarizing simplified design procedures for evaluation of foundation movements for transportation structures within the LRFD framework. Recommendations for the measurement methods of input parameters for those design procedures will also be provided.
- This project is a legacy project that was originally funded to Prof. James Schneider

Progress This Quarter *(includes meetings, work plan status, contract status, significant progress, etc.)*
- PhD student Max Garnier Villarreal has been working in this project and has been collecting deformation data from newly constructed bridges being on State Highway 51 project in Sun Prairie.
- Over the last 1.5 year, Mr. Garnier Villarreal installed survey targets in the new SB and NB bridges. Displacement measurements have been taken to evaluate the deformation of the bridge structures over the winter before the bridges were open to traffic.
- Along with the field monitoring, Mr. Garnier Villarreal Literature has continued evaluating the literature and comparing the response of transportation infrastructure supported with shallow and deep foundation and comparing the response to those of the a new GRS-IBS bridge system built in 2012 in Bloomer, WI.
- The results from the deformation of the new bridges in Highway 51 and the GRS-IBS bridge system in Bloomer, WI are being compared to assess how bridges with very different foundation systems are behaving. A finite element model is being run to better understand the responses and deformation of bridges.
- Literature review for foundation behavior and finite element modeling of foundations was continued

Anticipated Work Next Quarter
- Bridges will continue to be monitored to keep building on the measurements previously taken, to increase the data over time
- ANSYS Finite elements model are being combined with the deformation data collected in the field to assess foundation soils response.
- These results will be compiled into a final report that will include results from several bridges around the state.

Circumstances Affecting Project or Budget

- The SB road was open to traffic this past summer. We installed surveying points on the new structures on the SB/EB lane bridges while we are still collecting data for deformation on the NB bridge structures.
- We may need a longer monitoring time if a complete Winter cycle is to be incorporated into the assessment of the foundation system response.

Attach / Insert Gantt Chart and Other Project Documentation

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*(*enter text)*

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Staff Receiving QPR J. Walejko	Date Received (m/d/yyyy) 10/10/2014
Staff Approving QPR J. Horsfall	Date Approved (m/d/yyyy) 10/24/2014